**Mathematical symbols** are used to perform various operations. The symbols make it easier to refer Mathematical quantities. It is interesting to note that Mathematics is completely based on numbers and symbols. The **math symbols** not only refer to different quantities but also represent the relationship between two quantities. All mathematical symbols are mainly used to perform mathematical operations under various concepts.

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### List of Mathematical Symbols


- Basic Math Symbols
- Logic Symbols
- Calculus and Analysis Symbols
- Combinatorics Symbols
- Greek Alphabets
- Common Numeral Symbols
- Importance
- FAQs


| Symbol | Symbol Name in Maths | Math Symbols Meaning | Example |
|---|---|---|---|
| ≠ | not equal sign | inequality | 10 ≠ 6 |
| = | equal sign | equality | 3 = 1 + 2 |
| < | strict inequality | less than | 7 < 10 |
| > | strict inequality | greater than | 6 > 2 |
| ≤ | inequality | less than or equal to | x ≤ y, means, y = x or y > x, but not vice-versa. |

| Symbol | Symbol Name in Maths | Math Symbols Meaning | Example |
|---|---|---|---|
| **≥** | inequality | greater than or equal to | a ≥ b, means, a = b or a > b, but vice-versa does not hold true. |
| **[ ]** | brackets | calculate expression inside first | [ 2×5] + 7 = 10 + 7 = 17 |
| **( )** | parentheses | calculate expression inside first | 3 × (3 + 7) = 3 × 10 = 30 |
| **−** | minus sign | subtraction | 5 − 2 = 3 |
| **+** | plus sign | addition | 4 + 5 = 9 |
| **∓** | minus – plus | both minus and plus operations | 1 ∓ 4 = -3 and 5 |
| **±** | plus – minus | both plus and minus operations | 5 ± 3 = 8 and 2 |
| **×** | times sign | multiplication | 4 × 3 = 12 |
| * | asterisk | multiplication | 2 * 3 = 6 |
| **÷** | division sign / obelus | division | 15 ÷ 5 = 3 |
| **·** | multiplication dot | multiplication | 2 • 3 = 6 |
| **–** | horizontal line | division / fraction | 8/2 = 4 |
| **/** | division slash | division | 6 ⁄ 2 = 3 |
| **mod** | modulo | remainder calculation | 7 mod 3 = 1 |
| **$a^b$** | power | exponent | $2^4$ = 16 |
| **.** | period | decimal point, decimal separator | 4.36 = 4 +(36/100) |
| **√a** | square root | √a · √a = a | √9 = ±3 |
| **a^b** | caret | exponent | 2 ^ 3 = 8 |

| Symbol | Symbol Name in Maths | Math Symbols Meaning | Example |
|---|---|---|---|
| | | | |
| $\sqrt[4]{a}$ | fourth root | $\sqrt[4]{a} \cdot \sqrt[4]{a} \cdot \sqrt[4]{a} \cdot \sqrt[4]{a} = a$ | $\sqrt[4]{16} = \pm 2$ |
| $\sqrt[3]{a}$ | cube root | $\sqrt[3]{a} \cdot \sqrt[3]{a} \cdot \sqrt[3]{a} = a$ | $\sqrt[3]{343} = 7$ |
| % | percent | 1% = 1/100 | 10% × 30 = 3 |
| $\sqrt[n]{a}$ | n-th root (radical) | $\sqrt[n]{a} \cdot \sqrt[n]{a} \cdot \cdot \cdot$ n times = a | for n=3, $\sqrt[n]{8} = 2$ |
| ppm | per-million | 1 ppm = 1/1000000 | 10ppm × 30 = 0.0003 |
| ‰ | per-mille | 1‰ = 1/1000 = 0.1% | 10‰ × 30 = 0.3 |
| ppt | per-trillion | 1ppt = $10^{-12}$ | 10ppt × 30 = $3\times10^{-10}$ |
| ppb | per-billion | 1 ppb = 1/1000000000 | 10 ppb × 30 = $3\times10^{-}$ |

# Maths Logic symbols With Meaning

| Symbol | Symbol Name in Maths | Math Symbols Meaning | Example |
|---|---|---|---|
| ^ | caret / circumflex | and | x ^ y |
| · | and | and | x · y |
| + | plus | or | x + y |
| & | ampersand | and | x & y |
| \| | vertical line | or | x \| y |
| ∨ | reversed caret | or | x ∨ y |
| $\bar{X}$ | bar | not – negation | $\bar{x}$ |
| x’ | single-quote | not – negation | x’ |

| Symbol | Symbol Name in Maths | Math Symbols Meaning | Example |
|---|---|---|---|
| | | | |
| ! | Exclamation mark | not – negation | ! x |
| ¬ | not | not – negation | ¬ x |
| ~ | tilde | negation | ~ x |
| ⊕ | circled plus / oplus | exclusive or – xor | x ⊕ y |
| ⇔ | equivalent | if and only if (iff) | p: this year has 366 days<br>q: this is a leap year<br>p ⇔ q |
| ⇒ | implies | Implication | p: a number is a multiple of 4<br>q: the number is even<br>p ⇒ q |
| ∈ | Belong to/is an element of | Set membership | A = {1, 2, 3}<br>2 ∈ A |
| ∉ | Not element of | Negation of set membership | A={1, 2, 3}<br>0 ∉ A |
| ∀ | for all | Universal Quantifier | 2n is even ∀ n ∈ **N**<br>where **N** is a set of Natural Numbers |
| ↔ | equivalent | if and only if (iff) | p: x is an even number<br>q: x is divisible by 2<br>p ↔ q |
| ∄ | there does not exist | Negation of existential quantifier | b is not divisible by a, then ∄ n ∈ **N** such that b = na |
| ∃ | there exists | Existential quantifier | b is divisible by a, then ∃ n ∈ **N** such that b = na |
| ∵ | because / since | Because shorthand | a = b, b = c<br>⇒ a = c (∵ a = b) |
| ∴ | therefore | Therefore shorthand (Logical consequence) | x + 6 = 10<br>∴ x = 4 |

# Calculus and Analysis Symbol Names in Maths

In calculus, we have come across different math symbols. All mathematical symbols with names and meanings are provided here. Go through the all mathematical symbols used in calculus.

| Symbol | Symbol Name in Maths | Math Symbols Meaning | Example |
|---|---|---|---|
| **ε** | epsilon | represents a very small number, near-zero | $\varepsilon \to 0$ |
| **$\lim_{x \to a}$** | limit | limit value of a function | $\lim_{x \to a}(3x+1) = 3 \times a + 1 = 3a + 1$ |
| **y ‘** | derivative | derivative – Lagrange’s notation | $(5x^3)' = 15x^2$ |
| **e** | e constant / Euler’s number | e = 2.718281828… | $e = \lim (1+1/x)x , x \to \infty$ |
| **y(n)** | nth derivative | n times derivation | nth derivative of $3x^n = 3 n (n-1)(n-2)….(2)(1) = 3n!$ |
| **y”** | second derivative | derivative of derivative | $(4x^3)'' = 24x$ |
| | second derivative | derivative of derivative | |
| **dy/dx** | derivative | derivative – Leibniz’s notation | |
| | nth derivative | n times derivation | |
| | Second derivative of time | derivative of derivative | If $y = 4t^2$, then |
| | Single derivative of time | derivative by time – Newton’s notation | y = 5t, then |
| **$D^2x$** | second derivative | derivative of derivative | y” + 2y + 1 = 0 $\Rightarrow D^2y + 2Dy + 1 = 0$ |
| **Dx** | derivative | derivative – Euler’s notation | dy/x – 1 = 0 |

| Symbol | Symbol Name in Maths | Math Symbols Meaning | Example |
|---|---|---|---|
| | | | ⇒ Dy – 1 = 0 |
| ∫ | integral | opposite to derivation | $\int x^n\,dx = x^{n+1}/n + 1 + C$ |
| | partial derivative | Differentiating a function with respect to one variable considering the other variables as constant | $\partial(x^2+y^2)/\partial x = 2x$ |
| ∭ | triple integral | integration of the function of 3 variables | |
| ∬ | double integral | integration of the function of 2 variables | $\iint(x^3+y^3)dx\,dy$ |
| ∯ | closed surface integral | Double integral over a closed surface | $\iiint_V (\nabla.F)dV = \oiint_S (F.\hat{n})\,dS$ |
| ∮ | closed contour / line integral | Line integral over closed curve | $\oint_C 2/z\,dz$ |
| **[a,b]** | closed interval | [a,b] = {x \| a ≤ x ≤ b} | sin x ∈ [ – 1, 1] |
| ∰ | closed volume integral | Volume integral over a closed three-dimensional domain | $\iiint (x^2 + y^2 + z^2)\,dx\,dy\,dz$ |
| **(a,b)** | open interval | (a,b) = {x \| a < x < b} | f is continuous within (0, 1) |
| **z*** | complex conjugate | z = a+bi → z*=a-bi | If z = 3 + 2i then z* = 3 – 2i |
| **i** | imaginary unit | i ≡ √-1 | z = 3 + 2i |
| **∇** | nabla / del | gradient / divergence operator | ∇f (x,y,z) |
| | vector | A quantity with magnitude and direction | |
| **x * y** | convolution | Modification in a function due to the other function. | y(t) = x(t) * h(t) |
| ∞ | lemniscate | infinity symbol | 3x ≥ 0; x ∈ (0, ∞) |
| **δ** | delta function | Dirac Delta function | |

# Combinatorics Symbols Used in Maths

The different Combinatorics symbols used in maths concern the study of the combination of finite discrete structures. Some of the most important combinatorics symbols used in maths are as follows:

| Symbol | Symbol Name | Meaning or Definition | Example |
|---|---|---|---|
| ${}^nP_k$ | Permutation | | |
| n! | Factorial | n! = 1×2×3×...×n | 5! = 1×2×3×4×5 = 120 |
| ${}^nC_k$ | Combination | | |

## Greek Alphabet Letters Used in Maths

Mathematicians frequently use Greek alphabets in their work to represent the variables, constants, functions and so on. Some of the commonly used Greek symbols name in Maths are listed below:

| Greek Symbol | | Greek Letter Name | English Equivalent | Pronunciation |
|---|---|---|---|---|
| **Upper Case** | **Lower Case** | | | |
| Β | β | Beta | b | be-ta |
| Α | α | Alpha | a | al-fa |
| Δ | δ | Delta | d | del-ta |
| Γ | γ | Gamma | g | ga-ma |
| Ζ | ζ | Zeta | z | ze-ta |
| Ε | ε | Epsilon | e | ep-si-lon |
| Θ | θ | Theta | th | te-ta |
| Η | η | Eta | h | eh-ta |
| Κ | κ | Kappa | k | ka-pa |
| Ι | ι | Iota | i | io-ta |
| Μ | μ | Mu | m | m-yoo |
| Λ | λ | Lambda | l | lam-da |
| Ξ | ξ | Xi | x | x-ee |
| Ν | ν | Nu | n | noo |
| Ο | ο | Omicron | o | o-mee-c-ron |
| Π | π | Pi | p | pa-yee |
| Σ | σ | Sigma | s | sig-ma |
| Ρ | ρ | Rho | r | row |
| Υ | υ | Upsilon | u | oo-psi-lon |
| Τ | τ | Tau | t | ta-oo |
| Χ | χ | Chi | ch | kh-ee |
| Φ | φ | Phi | ph | f-ee |
| Ω | ω | Omega | o | o-me-ga |
| Ψ | ψ | Psi | ps | p-see |

# Common Numeral Symbols Used in Maths

The roman numerals are used in many applications and can be seen in our real-life activities. The common Roman numeral symbols used in Maths are as follows.

| Name | European | Roman | Arabic | Hebrew |
|---|---|---|---|---|
| **zero** | 0 | n/a | ٠ | n/a |
| **one** | 1 | I | ١ | א |
| **two** | 2 | II | ٢ | ב |
| **three** | 3 | III | ٣ | ג |
| **four** | 4 | IV | ٤ | ד |
| **five** | 5 | V | ٥ | ה |
| **six** | 6 | VI | ٦ | ו |
| **seven** | 7 | VII | ٧ | ז |
| **eight** | 8 | VIII | ٨ | ח |
| **nine** | 9 | IX | ٩ | ט |
| **ten** | 10 | X | ١٠ | י |
| **eleven** | 11 | XI | ١١ | יא |
| **twelve** | 12 | XII | ١٢ | יב |
| **thirteen** | 13 | XIII | ١٣ | יג |
| **fourteen** | 14 | XIV | ١٤ | יד |
| **fifteen** | 15 | XV | ١٥ | טו |
| **sixteen** | 16 | XVI | ١٦ | טז |
| **seventeen** | 17 | XVII | ١٧ | יז |
| **eighteen** | 18 | XVIII | ١٨ | יח |
| **nineteen** | 19 | XIX | ١٩ | יט |
| **twenty** | 20 | XX | ٢٠ | כ |

| Name | European | Roman | Arabic | Hebrew |
|---|---|---|---|---|
| | | | | |
| **thirty** | 30 | XXX | ٣٠ | ל |
| **forty** | 40 | XL | ٤٠ | מ |
| **fifty** | 50 | L | ٥٠ | נ |
| **sixty** | 60 | LX | ٦٠ | ס |
| **seventy** | 70 | LXX | ٧٠ | ע |
| **eighty** | 80 | LXXX | ٨٠ | פ |
| **ninety** | 90 | XC | ٩٠ | צ |
| **one hundred** | 100 | C | ١٠٠ | ק |

These are some of the most important and commonly used symbols in mathematics. It is important to get completely acquainted with all the maths symbols to be able to solve maths problems efficiently. It should be noted that without knowing maths symbols, it is extremely difficult to grasp certain concepts on a universal scale. Some of the key importance of maths symbols are summarized below.

## Importance of Mathematical Symbols

- Helps in denoting quantities
- Establishes relationships between quantities
- Helps to identify the type of operation
- Makes reference easier
- Maths symbols are universal and break the language barrier

# Frequently Asked Questions on Math Symbols

Q1

## What is the pi symbol in Maths?

The pi symbol is a mathematical constant, which is approximately equal to 3.14. The symbol of pi is π and it is a Greek alphabet. Pi is an irrational number which is defined as the ratio of circle circumference to its diameter.

Q2

## What is e symbol in mathematics?

The “e” symbol in maths represents Euler’s number which is approximately equal to 2.71828…It is considered as one of the most important numbers in mathematics. It is an irrational number and it cannot be represented as a simple fraction

Q3

## Write down the symbols for basic arithmetic operations.

The symbols for basic arithmetic operations are addition (+), subtraction (-), Multiplication (×), Division(÷).

Q4

## Why do we use mathematical symbols?

Mathematics is a universal language and the basics of maths are the same everywhere in the universe. Mathematical symbols play a major role in this. The definition and the value of the symbols are constant. For example, the Roman letter X represents the value 10 everywhere around us.

Q5

## Mention the logic symbols in maths.

The logic symbols in maths are:

AND (^)

OR (∨)

NOT (¬)

Implies (⇒)

Equivalent (⇔)

For all (∀)

There exists (∃)